

SOUTH AFRICAN PAVEMENT ENGINEERING MANUAL

Chapter 11

Documentation and Tendering



**AN INITIATIVE OF THE SOUTH
AFRICAN NATIONAL ROADS AGENCY SOC LTD**

Date of Issue: October 2014

Second Edition

**South African Pavement Engineering Manual
Chapter 11: Documentation and Tendering**

© 2013 South African National Roads Agency SOC Ltd. All rights reserved.

**First edition published 2013
Second edition published 2014**

Printed in the Republic of South Africa

**SET: ISBN 978-1-920611-00-2
CHAPTER: ISBN 978-1-920611-11-8**

**www.nra.co.za
sapem@nra.co.za**

SOUTH AFRICAN PAVEMENT ENGINEERING MANUAL

Chapter 11

Documentation and Tendering



**AN INITIATIVE OF THE SOUTH
AFRICAN NATIONAL ROADS AGENCY SOC LTD**

Date of Issue: October 2014

Second Edition

BACKGROUND

1. Introduction

2. Pavement Composition and Behaviour

TESTING AND LABORATORY

3. Materials Testing

4. Standards

5. Laboratory Management

INVESTIGATION

6. Road Prism and Pavement Investigations

7. Geotechnical Investigations and Design Considerations

8. Material Sources

DESIGN

9. Materials Utilisation and Design

10. Pavement Design

You are
here



DOCUMENTATION AND TENDERING

11. Documentation and Tendering

IMPLEMENTATION

12. Construction Equipment and Method Guidelines

QUALITY MANAGEMENT

13. Acceptance Control

POST CONSTRUCTION

14. Post-Construction

South African Pavement Engineering Manual

Chapter 11: Documentation and Tendering

SCOPE

The South African Pavement Engineering Manual (SAPEM) is a reference manual for all aspects of pavement engineering. SAPEM is a best practice guide. There are many relevant manuals and guidelines available for pavement engineering, which SAPEM does not replace. Rather, SAPEM provides details on these references, and where necessary, provides guidelines on their appropriate use. Where a topic is adequately covered in another guideline, the reference is provided. SAPEM strives to provide explanations of the basic concepts and terminology used in pavement engineering, and provides background information to the concepts and theories commonly used. SAPEM is appropriate for use at National, Provincial and Municipal level, as well as in the Metros. SAPEM is a valuable education and training tool, and is recommended reading for all entry level engineers, technologists and technicians involved in the pavement engineering industry. SAPEM is also useful for practising engineers who would like to access the latest appropriate reference guideline.

SAPEM consists of 14 chapters covering all aspects of pavement engineering. A brief description of each chapter is given below to provide the context for this chapter, Chapter 11.

Chapter 1: Introduction discusses the application of this SAPEM manual, and the institutional responsibilities, statutory requirements, basic principles of roads, the road design life cycle, and planning and time scheduling for pavement engineering projects. A glossary of terms and abbreviations used in all the SAPEM chapters is included in Appendix A. A list of the major references and guidelines for pavement engineering is given in Appendix B.

Chapter 2: Pavement Composition and Behaviour includes typical pavement structures, material characteristics and pavement types, including both flexible and rigid pavements, and surfacings. Typical materials and pavement behaviour are explained. The development of pavement distress, and the functional performance of pavements are discussed. As an introduction, and background for reference with other chapters, the basic principles of mechanics of materials and material science are outlined.

Chapter 3: Materials Testing presents the tests used for all material types used in pavement structures. The tests are briefly described, and reference is made to the test number and where to obtain the full test method. Where possible and applicable, interesting observations or experiences with the tests are mentioned. Chapters 3 and 4 are complementary.

Chapter 4: Standards follows the same format as Chapter 3, but discusses the standards used for the various tests. This includes applicable limits (minimum and maximum values) for test results. Material classification systems are given, as are guidelines on mix and materials composition.

Chapter 5: Laboratory Management covers laboratory quality management, testing personnel, test methods, and the testing environment and equipment. Quality assurance issues, and health, safety and the environment are also discussed.

Chapter 6: Road Prism and Pavement Investigation discusses all aspects of the road prism and pavement investigations, including legal and environmental requirements, materials testing, and reporting on the investigations. The road pavement investigations include discussions on the investigation stages, and field testing and sampling (both intrusively and non-intrusively), and the interpretation of the pavement investigations. Chapters 6 and 7 are complementary.

Chapter 7: Geotechnical Investigations and Design Considerations covers the investigations into fills, cuts, structures and tunnels, and includes discussion on geophysical methods, drilling and probing, and stability assessments. Guidelines for the reporting of the investigations are provided.

Chapter 8: Material Sources provides information for sourcing materials from project quarries and borrow pits, commercial materials sources and alternative sources. The legal and environmental requirements for sourcing materials are given. Alternative sources of potential pavement materials are discussed, including recycled pavement materials, construction and demolition waste, slag, fly ash and mine waste.

Chapter 9: Materials Utilisation and Design discusses materials in the roadbed, earthworks (including cuts and fills) and all the pavement layers, including soils and gravels, crushed stones, cementitious materials, primes, stone precoat fluids and tack coats, bituminous binders, bitumen stabilized materials, asphalt, spray seals and micro surfacings, concrete, proprietary and certified products and block paving. The mix designs of all materials are discussed.

South African Pavement Engineering Manual

Chapter 11: Documentation and Tendering

Chapter 10: Pavement Design presents the philosophy of pavement design, methods of estimating design traffic and the pavement design process. Methods of structural capacity estimation for flexible, rigid and concrete block pavements are discussed.

Chapter 11: Documentation and Tendering covers the different forms of contracts typical for road pavement projects, including conventional contracts, product performance guarantee systems, design and construct, and concessions. In the documentation sections, the design, contract and tender documentation are discussed. The tender process is also discussed, from pre-qualification, through site inspection, to tendering and tender evaluation. The contract documentation is discussed, from the tender award to the close-out of the Works.

Chapter 12: Construction Equipment and Method Guidelines presents the nature and requirements of construction equipment and different methods of construction. The construction of trial sections is also discussed. Chapters 12 and 13 are complementary, with Chapter 12 covering the proactive components of road construction, i.e., the method of construction. Chapter 13 covers the reactive components, i.e., checking the construction is done correctly.

Chapter 13: Quality Management includes acceptance control processes, and quality plans. All the pavement layers and the road prism are discussed. The documentation involved in quality management is also discussed, and where applicable, provided.

Chapter 14: Post-Construction incorporates the monitoring of pavements during the service life, the causes and mechanisms of distress, and the concepts of maintenance, rehabilitation and reconstruction.

FEEDBACK

SAPeM is a "living document". The first edition was made available in electronic format in January 2013, and a second edition in October 2014. Feedback from all interested parties in industry is appreciated, as this will keep SAPeM relevant.

To provide feedback on SAPeM, please email sapem@nra.co.za.

South African Pavement Engineering Manual

Chapter 11: Documentation and Tendering

ACKNOWLEDGEMENTS

This compilation of this manual was funded by the South African National Road Agency SOC Limited (SANRAL). The project was coordinated on behalf of SANRAL by Kobus van der Walt and Steph Bredenhann. Professor Kim Jenkins, the SANRAL Chair in Pavement Engineering at Stellenbosch University, was the project manager. The Cement and Concrete Institute (C & CI) and Rubicon Solutions provided administrative support.

The following people contributed to the compilation of Chapter 11:

- **Task Group Leader:** Arthur Taute, SMEC South Africa
- Hennie Kotzé, SANRAL

This SAPEM manual was edited by Dr Fenella Johns, Rubicon Solutions.

Photos for this chapter were provided by:

- Arthur Taute, SMEC South Africa

South African Pavement Engineering Manual

Chapter 11: Documentation and Tendering

TABLE OF CONTENTS

1.	Introduction	1
2.	Forms of Procurement.....	2
2.1	Conventional Contracts.....	3
2.2	Product Performance Guarantee System (PPGS)	4
2.3	Design and Construct (D&C)	4
2.4	Design, Build and Operate (DBO)	4
2.5	Concession	5
2.6	Other Forms of Contract	5
3.	Design Documentation	7
4.	Contract Documentation Preparation.....	8
4.1	Important Aspects for Documentation Preparation	9
5.	Tender Documentation.....	11
5.1	General Document Contents	12
5.1.1	Part T: Documents that Relate Solely to the Tender.....	12
5.1.2	Part C: Documents that Relate Solely to the Contract.....	12
5.2	Typical Roadworks Documentation	13
6.	Tender Process	21
6.1	Advertising Tenders	21
6.2	Pre-Qualification	21
6.3	Clarification Meeting.....	21
6.4	Tendering	21
6.5	Tender Evaluation.....	22
7.	Contract Documentation	23
7.1	Compilation of the Contract Document.....	23
7.2	Award of Contract.....	23
7.3	Site Handover.....	23
7.4	Monitoring of the Works	23
7.5	Close-out of the Works.....	23
	References and Bibliography	24

LIST OF TABLES

Table 1.	Common Forms of Procurement.....	2
----------	----------------------------------	---

LIST OF FIGURES

Figure 1.	Procurement of Works.....	1
Figure 2.	Types of FIDIC Contracts.....	2
Figure 3.	Client's and Contractor's Risks.....	3
Figure 4.	Examples of General Conditions of Contract Published by SAICE	3
Figure 5.	COLTO Standard Specifications for Roads and Bridge Works	9
Figure 6.	SANS 10403 and CIDB C1: Formatting and Compilation of Construction Procurement Documents	11
Figure 7.	General Conditions of Contract for Construction Works.....	15
Figure 8.	NEC Contracts	16
Figure 9.	Occupational Health and Safety (OHS) Organisational Structure	19

1. INTRODUCTION

When the design is complete and is approved by all interested and affected parties, the process can proceed to the procurement of the Works needed to construct the facility. The processes associated with this are shown in Figure 1.

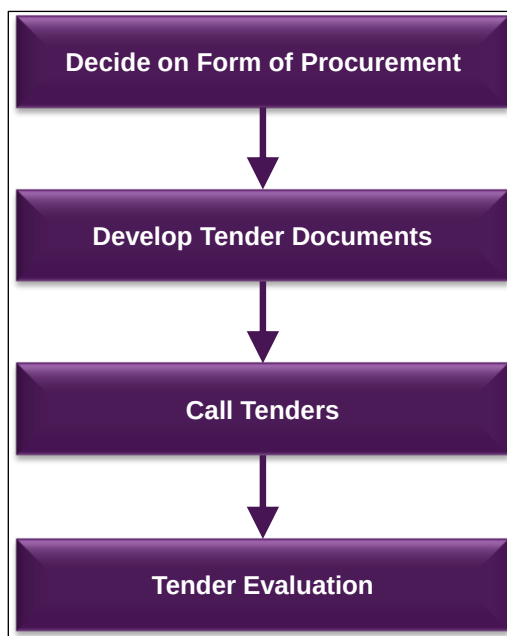


Figure 1. Procurement of Works

The purpose of procurement and tendering is to obtain priced offers from competent teams to carry out the work. Offers from different tenderers are compared in a fair and transparent manner, and the work is awarded to the most favourable offer.

In the field of road development, it is also essential to ensure that the procurement process assists in developing the industry, so that the pool of resources available to carry out the work expands and remains competitive. In addition, it is also essential to ensure that the procurement process makes all the client needs and related risks known to potential tenderers, so that they respond appropriately and price the work based on a good understanding of what is required.

Although the compilation of the tender documents follow upon the approval of the design, some of the work required for the compilation of tender documents might already have started towards the end of the design phase. For example, changes required to standard specifications should be identified during the design phase. The determination of quantities is also done at the end of the design phase to provide the client with a cost estimate of the Works when the design is submitted for approval.



Standard Specifications

Note that when this chapter was written and updated, the 1998 version of the COLTO Standard Specifications was being used. However, these specifications are currently being reviewed. A revised version of the Standard Specifications is likely to be published in 2015 and is likely to be issued either by SANS or COTO.

In this chapter, reference is only made to the Standard Specifications, which currently refers to the 1998 COLTO version.

2. FORMS OF PROCUREMENT

The procurement of the Works for road construction takes on many forms, with some examples shown in Figure 2. Each procurement form is suited to particular circumstances. The various forms are outlined in Table 1. FIDIC is the *Fédération Internationale des Ingénieurs-Conseils* (International Federation of Consulting Engineers).

The risks associated with the various forms of procurement are transferred from the client to the Contractor in increasing proportions as shown in Figure 3.

Conventional wisdom is to allocate risk to the party best placed to manage it. Therefore, it is standard practice to use the contract most suited to the associated risk profile, as described in the next sections.



Allocating Risk

Conventional wisdom is to allocate the risk to the party best placed to manage it.



Figure 2. Types of FIDIC Contracts

Table 1. Common Forms of Procurement

Procurement Type	Comment
Conventional Procurement	The contractor is appointed by the client to construct the works as designed by the designer. Normally the designer is a consulting engineer. The consulting engineer also administers the contract and monitors that the contractor constructs the Works as designed, and that the works comply with the specified requirements.
Product Performance Guarantee System (PPGS)	The contractor includes a guarantee for one of the final products constructed/used in the works, which is normally a proprietary product or for the result of work utilising a proprietary product. Examples are a specific type of final surfacing, such as a UTFC, a type of bridge joint, or, the sealing of joints in concrete pavements utilising a proprietary joint sealant. Therefore, there is a reduced need for monitoring quality during construction on behalf of the client.
Design and Construct	The client specifies the works (facility) required and its intended purpose. The contractor employs a designer and delivers a Turnkey solution that must meet the intended purpose of the facility. Turnkey implies the client literally turns the key and takes over the road.
Design, Build and Operate (DBO)	The client specifies the works (facility) required and its intended purpose, as well as hand-over conditions. The contractor employs a designer and delivers a Turnkey solution that meets the client requirements. The contractor then operates and maintains the facility for a specified period before handing it over to the client.
Concession	The concessionaire, which is typically a consortium consisting of a contractor, consulting engineer (designer) and financier, provides a complete solution for a section of road for a preset period of time, the concession period. Only the level of service provided to users is audited by the client during the concession period.

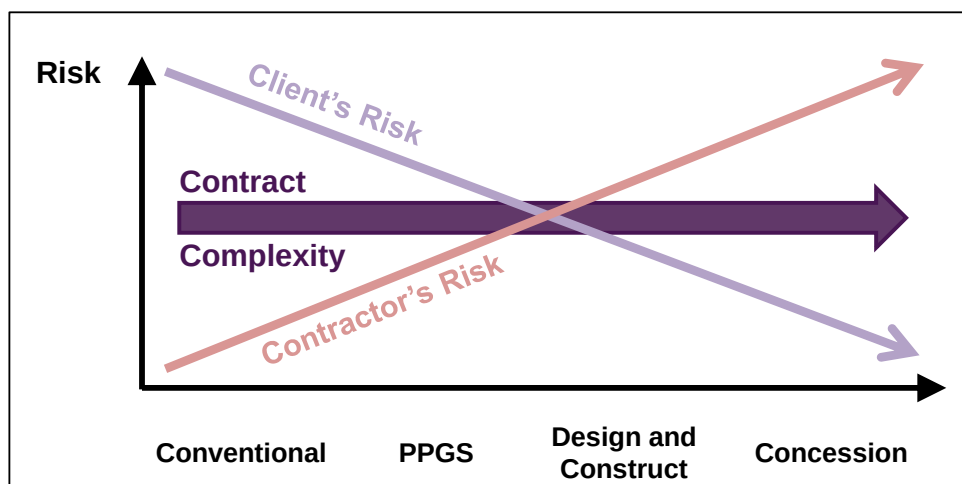


Figure 3. Client's and Contractor's Risks

2.1 Conventional Contracts

Conventional contracts are suited to projects where the client, or their agent (consulting engineer), knows what is required and can specify this in the tender and contract documentation. The contractor then prices the tender with the knowledge of what is required and how to achieve those requirements. The client has systems and resources, such as consulting engineers, in place to ensure that the contractor achieves these desired requirements during construction, in the knowledge that if these are achieved, the project will be successful.

This form of contract is normally suited to road construction and rehabilitation situations where the clients, consulting engineers and contractors are all knowledgeable and have a good understanding of readily available technologies and materials. It is the most suitable form of contract for roadworks where there is sufficient time for investigation, design and contract documentation. All the possible uses of locally available materials are investigated and all risks can be identified and allowed for in the contract documents. All the items of work are properly quantified and specified in the design, schedule of quantities and related specification and documentation. The contractor, in turn, prices these items with minimal allowance for extraneous risks. Variation orders are issued during construction to cater for any situations that were not catered for in the bill of quantities. This type of contract therefore delivers a fair price for the work involved. Typical examples for general conditions of contract published by SAICE (GCC, 2010) are shown in Figure 4, and the FIDIC Conditions of Contract are shown in Figure 2.

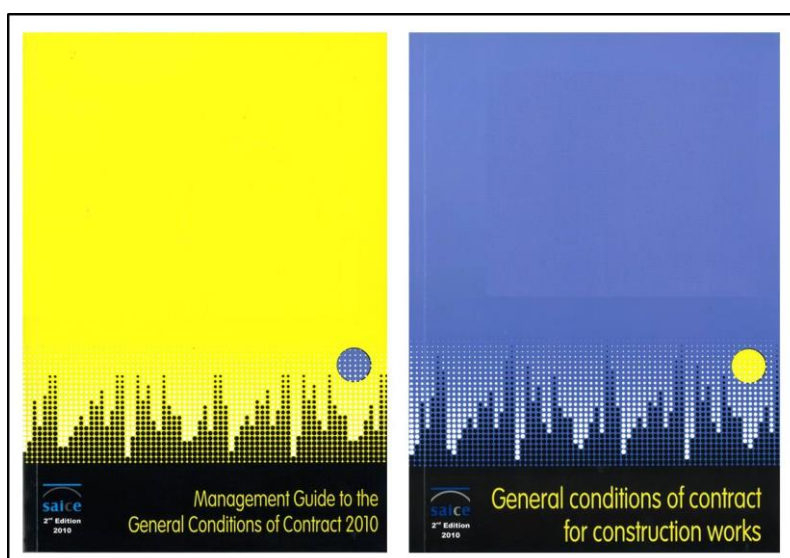


Figure 4. Examples of General Conditions of Contract Published by SAICE

2.2 Product Performance Guarantee System (PPGS)

Product Performance Guarantee System (PPGS) contracts are suited to situations where there are a variety of proprietary products available to meet the requirements. In such a situation, it is not possible to specify all the product qualities, or to easily compare like with like in a tender evaluation, in view of the proprietary, and often “secret”, nature of the material qualities. In such situations, it may be simpler to specify a short term performance guarantee, and accept the best price offered to achieve this performance.

This form of contract is suited to a situation where, for example, certain functional requirements such as skid resistance are required on a road, which has a strong pavement that is unlikely to influence performance of the friction course. This form of contract is also only suitable if there is a high likelihood that the contractor can meet its guarantee requirements should something go wrong. Normally the guarantee is only a relatively short duration, say 3 years, on the assumption that if the product lasts for 3 years it should provide adequate performance for another 4 to 7 years.

A PPGS contract can be a stand-alone contract, or be part of a conventional contract, which only covers parts of the works.



PPGS: Know your Existing Pavement

PPGS type contracts should only be used if no uncertainty exists about the condition of the existing pavement. For example, if the condition of the pavement is suspect, placing a UTFG under a PPGS can create many issues during yearly inspections that attempt to locate the cause of failures.

2.3 Design and Construct (D&C)

A design and construct form of contract means that the contractor employs a designer to design the project to meet its intended purpose. The contract documents need only specify the intended purpose of the project and any related performance requirements. The contractor’s team then design the facility to suite the contractors own capabilities, and to meet the performance requirements and intended purpose.

This form of contract is suited to bridges, for example, where the contractor may have specific formwork or techniques available that may suit the project and offer unique benefits that are not be realised in a conventional contract. However, in roadworks where the underlying quality is difficult to discern immediately, the client needs to ensure that a sufficiently long defects liability period is in place to prove the quality of the works and their “fitness for purpose” over the medium term. For this reason, such works normally have an extended guarantee period of between 3 and 5 years. Where innovative methods and products are used, that have not been well established, the client may require an even longer defects liability period, up to 8 years. During this, the contractor has to rectify any defects that occur due to quality problems in respect of design and construction that were not detected during construction. On this type of contract the client has minimal control of quality as the contractor has to deliver a product that is “fit for purpose”.

There are certain inherent inefficiencies in this type of procurement in that each tenderer has its own design team, who needs to design the facility in order for it to be priced and tendered. The design cost is only recovered by the successful tenderer. In addition, as it is unlikely that any variation orders will be issued during construction, all possible risks have to be identified by the contractor’s team during the tender phase and allowed for in the price. Therefore, the client pays for these risks, whether or not they materialize.

2.4 Design, Build and Operate (DBO)

The design, build and operate form of contract is an extension of the design and construct contract. The contractor operates and maintains the facility for an extended period, normally, between 5 and 15 years. This form of contract takes out some of the client risks associated with quality that may occur on a typical D&C contract. All quality issues need to be addressed by the contractor during the operations and maintenance (O&M) period, to ensure the hand back requirements are met when the facility is handed over to the client. This type of contract is becoming increasingly popular where the client does not have the necessary capacity to manage and operate the infrastructure.

In roadworks, this form of contract is primarily suitable for a substantial section of road. The Contractor needs to develop and maintain a maintenance establishment for the duration of the period. The client needs certainty that the Contractor will be in existence for that period and be able to attend to issues that arise.

An extension of this form of Contract is the DBFO contract, where financing the works also becomes the responsibility of the Contractor. The Contractor’s financial contribution is reimbursed over part of the operation and maintenance period. This type of contract is not normally suitable for roadworks, as roads budgets and related

projects can generally be adjusted to deliver the required infrastructure from annual budgets, and finance charges do not need to be incurred.

A similar contract to DBO is Build, Finance and Operate (BFO) contracts used in the UK. The concessionaire is paid a monthly shadow toll by the Road Authority, which depends on the availability of road lanes to traffic and an estimated monthly traffic volume. This has the advantage of using private sector finance to design, construct and manage the facility. A potential disadvantage is that the Road Authority has to pay the monthly shadow toll, regardless of its own financial situation. In times of reduced budgets, road authority payments for many such contracts can drain the budget to the point where only minimal amounts are left over for other work.



Shadow Tolling

A shadow toll is a contractual payment made by a government per driver or vehicle using a road to a private company that operates a road built or maintained using private finance initiative funding. Payments are based, at least in part, on the number of vehicles using a section of road, often over a 20 to 30 year period. The shadow tolls or per vehicle fees are paid directly to the company without intervention or direct payment from the user. (www.wikipedia.com)

2.5 Concession

These contracts are often called Build, Operate, Toll, Transfer (BOTT) contracts and are allied to Design, Build, Finance, Operate (DBFO) contracts. In this form of contract, the Concessionaire is allowed to build, operate and manage the entire facility and provide the required service levels for the duration of the concession period. At the end of the concession period, the facility is transferred back to the client.

In most cases, the concessionaire is paid for providing the required service levels through tolls or some form of shadow tolling. A monthly amount is paid, subject to an audit that the required service levels are being maintained. The duration of the concession is determined by the capital amount invested by the concessionaire, and the concomitant time required to recover that investment and provide for risks that may arise.

The inefficiencies listed above under design and construct are all inherent in this form of contract. In addition, the tender evaluation of such a contract is a complex and difficult task. Many different solutions may be offered that all have to be evaluated and compared fairly. Therefore, the minimum duration of concession contracts normally range between 15 and 30 years.

When properly constituted, concession contracts can yield valuable long term benefits in terms of the development of new "road owners" with new ideas, and the ability to deal with problems quickly and effectively. While in some cases Concession contracts may seem expensive, it should be noted that at least 40% of all profits made out of road users provide some form of public benefit in the form of corporate tax and VAT.



Concession Contracts

In South Africa, SANRAL currently has concession contracts with:

- **Bakwena**, who operate the N1 north of Pretoria and the N4 west of Pretoria
- **TRAC**, who operate the N4 between Pretoria and Maputo
- **N3TC**, who operate the N3 between Heidelberg and Pietermaritzburg
- **NTC**, who operate the N1 from Bela-Bela to Polokwane

The first three contracts are responsible for collecting the tolls, and managing the network based on strict criteria using on the toll income.

With the NTC contact, SANRAL collects the tolls and pays a standard monthly fee to NTC, thereby removing the risk for the concessionaire.

2.6 Other Forms of Contract

There are several other forms of contract that are considered from time to time. For example:

- **Leasing and management** contracts, where a private sector institution manages a facility or leases it from the owner over a fixed period, to provide specified levels of service.
- **Routine maintenance** contracts are a form of management contract, where a consulting engineer and contractor manage the maintenance of a road over 3 to 5 years. In these situations, the consulting engineer may manage what needs to be done to ensure effectiveness, while the contractor manages how to do it as efficiently as possible. Initially, the client may carry all of the risks associated with such contracts. But, as the consulting engineer and contractor team become proficient in understanding what needs to be done and the related costs, more risk can be passed to this team by only specifying performance levels instead of paying unit rates for work done.

- **Cost Plus or Open Book Contract**

A cost-plus or open book contract, is a contract where a contractor is fully paid for all of the allowed expenses, such as the cost of materials, plus an additional payment to allow for a profit.

3. DESIGN DOCUMENTATION

Designs have to be carried out in conformance with the client's codes of procedure, and should be appropriate, follow generally accepted standards and engineering best practice. These specify design inputs, and describe investigation and calculation procedures. The design drawings and investigation documentation should also be prepared in accordance with the clients codes of practice, so that they conform to the requirements for contract documentation. In most cases, these codes are obtained from the client or the Construction Industry Development Board (CIDB) or downloaded from their websites, www.cidb.org.za. Design documentation is discussed in more detail in Chapter 6: 9 and Chapter 7: 9.

4. CONTRACT DOCUMENTATION PREPARATION

When a design is complete, the consulting engineer usually prepares contract documentation on behalf of the client. The contract documents include:

- Tender requirements, conditions, rules and adjudication process
- Conditions of contract
- Specifications
- Schedule of quantities
- Forms showing compliance with tender requirements.
- Forms of offer and acceptance

The contract documents are developed in a style and format specified by the client, and comply with the CIDB Standards for Uniformity in Construction Procurement (CIDB, August 2006).

Further references include a series of Practice Manuals, prepared by SAICE, that provide guidance to the use of the CIDB and SANS standards for preparing contract documents. These manuals are updated from time to time and include:

- **SAICE Practice Manual #1:** The Use of the South African National Standards in Construction Procurement. (2004a)
- **SAICE Practice Manual #2:** Delivering Construction Projects Using the Design by Client Contracting Strategy. (2004b)

Prospective tenderers must be aware of the type of contract and related contractual obligations and specifications in order to tender. On most rural road tenders in South Africa, the COLTO Standard Specification for Roads and Bridge Works is used. A revision of these specifications is underway.



Know the Type of Contract

Prospective tenderers must be aware of the type of contract and related contractual obligations and specifications in order to tender.

Most of the discussion in this section, and the following sections, focus on Conventional Contracts.



Contracts for Geotechnical Investigations & Site Laboratories

A similar contract process and format as discussed in this Chapter, is followed for activities such as geotechnical investigations and the provision of site laboratories. These contracts normally apply to high cost activities, which are not included in the contract between the client and their client's agent.

SANRAL has pro-forma contracts for geotechnical investigations and the provision of site laboratories.

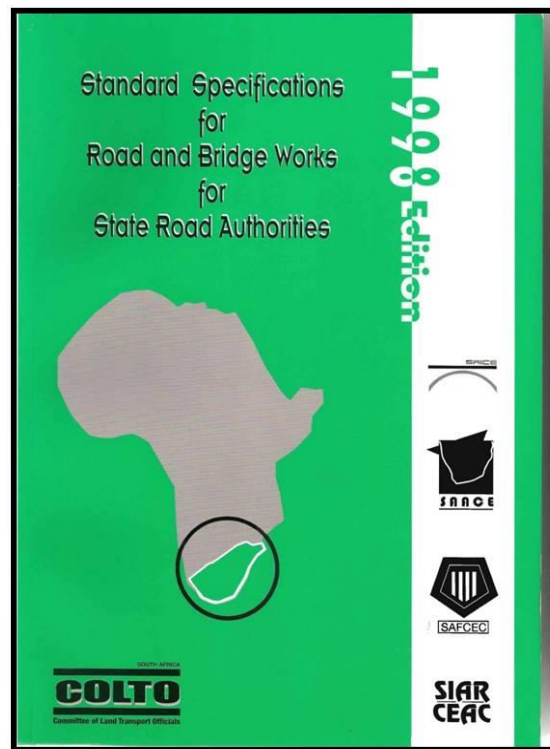


Figure 5. COLTO Standard Specifications for Roads and Bridge Works

4.1 Important Aspects for Documentation Preparation

Some selected aspects that need particular attention when drawing up documentation are:

- (i) The **description** of the Works needs to be clear and include all pertinent issues contained in the Works.
- (ii) Any apparent conflict between the required use of certain **material sources and material quality specifications** must be addressed. The documents may specify the use of certain material sources for layers with fixed quality requirements. The designer should be reasonably sure that the materials from these sources are of adequate quantities, and can meet the required specification. Otherwise, the contractor could claim that the material is unsuitable. In many cases, this may have to be resolved with careful selection of materials in the borrow pits and should be noted on the drawings.
- (iii) **Sequencing and production rates** for different construction activities need to be taken into account when the duration of the contract is determined. See Chapter 12: 5 for typical production rates used in standard construction processes.
- (iv) **Seasonal moisture changes** can have a major influence on constructability. Where such risks could be significant, they should be highlighted in the documents.
- (v) Areas that may experience **persistent light rainfall** need careful consideration of the contract duration and the criteria for extension of time.
- (vi) **Occupational Health and Safety Act** aspects need to be included insofar as they relate to safety and health. In most cases, these should include safety factors related to accommodation of traffic.
- (vii) Any relevant **payment factors** should be considered, such as, additional pay factors for better riding quality or asphalt consistency and quality.
- (viii) **Proprietary products** are sometimes useful and may not be specified explicitly but only in generic terms. Where proprietary products are offered, it must be accompanied by a PPGS or a Agrément SA compliance/fit-for-purpose certificate must be provided.
- (ix) Allowance needs to be made for increased quantities of **patching and crack sealing** that may occur between the time of the field investigations and the actual construction of the Works.

- (x) The **quantities for patches** need careful consideration. The size of the patches is an important consideration, in that the quantities required are different for many small patches (< 5 m²) versus fewer larger patches. Small and large patches are billed separately.
- (xi) The **processing time for approval** of the environmental impact assessment (**EIA**) and issuing of the record of decision (**RoD**) must be noted, and taken into account in the prospective tender dates used in the documents. If the on-site manufacture of materials such as crushed stone or asphalt is contemplated, the time required for mining and environmental approvals must be considered and the necessary adjustments made to the contract period. The time required to obtain these approvals can be significant.
- (xii) **Services in urban and semi-urban areas** always present problems if in the way of the Works, and need to be properly investigated and allowed for in the schedules.
- (xiii) Testing must be carried out using **stabilizers** that are readily available for the project in the area. The most appropriate stabilizer must be specified in the documentation. Provision must be made for the non-availability of such stabilizers during construction.
- (xiv) **Traffic accommodation** often represents an important part of all Works, and must be carefully considered and allowed for in the design and documentation.
- (xv) **Subgrade conditions that present problems**, and show significant variance to the materials investigation results, cause problems during construction. Care needs to be taken to minimise the risk of this occurring.
- (xvi) Geotechnical reports and the information contained in Part C4 of the tender documents need to present a **reasonable factual view of the expected conditions**.
- (xvii) Care needs to be taken when **classifying materials** as soft, intermediate and hard. The quantities included should be adequate to **avoid having very high prices for very low quantities** of certain material classes.
- (xviii) Ensure **payment items** in the schedule of quantities are contained in the specifications, and vice versa. Also ensure the payment item descriptions are the same in the schedule and in the specifications.
- (xix) Ensure there are **no ambiguities or contradictions** in the documentation, which may lead to claims.
- (xx) Ensure specifications are of such a nature that it is **constructable by the contractor**.
- (xxi) Ensure that **everything the contractor is required to do** is covered by the pay items.

5. TENDER DOCUMENTATION

The format of tender documentation in South Africa is specified by SANS 10403 "*Formatting and Compilation of Construction Procurement Documents*" (shown in Figure 6) the Construction Industry Development Board (www.CIDB.org.za). The various CIDB guidelines and prescripts give more details on how to compile tender documents to ensure uniformity of documentation, and certainty and fairness in procurement processes. These guidelines should, therefore, be consulted and applied in all cases. The discussion in this section focusses on the CIDB guidelines.

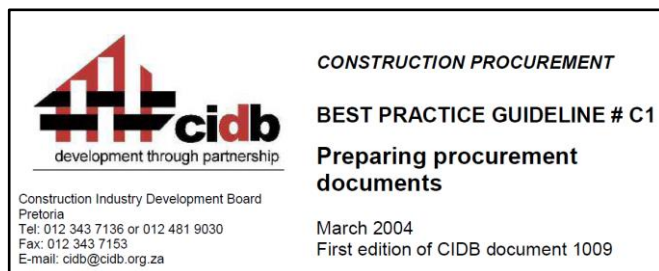


Figure 6. SANS 10403 and CIDB C1: Formatting and Compilation of Construction Procurement Documents

In many cases client bodies also develop their own pro-forma tender documents and related guidelines, and include details of their own special conditions of contract, administration and related requirements. These are updated fairly regularly by clients to accommodate issues that occur over time. The latest version should always be obtained prior to compiling a contract document.

When preparing tender documents, it is important to provide as much information as possible to allow the Contractor to price the works fairly, and to understand the site conditions and related risks that must be accommodated in the price.



Preparing Tender Documentation

When preparing tender documents, it is important to provide as much information as possible to allow the Contractor to price the works fairly, and to understand the site conditions and related risks that must be accommodated in the price.

5.1 General Document Contents

In accordance with the CIDB Guidelines, the tender document should have the following contents:

5.1.1 Part T: Documents that Relate Solely to the Tender

(i) Part T1: Tendering Procedures

- **T1.1 Tender Notice and Invitation to Tender:** Alerts tenderers to the nature of the supplies, services and Engineering and Construction Works required by the client. Should contain sufficient information to enable tenderers to respond appropriately.
- **T1.2 Tender Data:** States what the applicable conditions of tender are, and where they may be found. Tender Data also provides the variables for standardised conditions of tender, such as the required insurances and tender validity periods.

(ii) Part T2: Returnable Documents

- **T2.1 List of Returnable Documents:** Ensures that everything the client requires a tenderer to submit with the tender is included in, or returned with, the tender submission.
- **T2.2 Returnable Schedules:** Contains documents that the tenderer is required to complete for the purpose of evaluating tenders and other schedules, which upon acceptance become part of the subsequent contract.

5.1.2 Part C: Documents that Relate Solely to the Contract

The information contained in Part C of the Tender Document enables the tenderer to price the tender and to decide upon the method of working and programming.

(i) Part C1: Agreements and Contract Data

- **C1.1 Form of Offer and Acceptance:** Formalises the legal process of offer and acceptance.
- **C1.2 Contract Data:** States the applicable conditions of contract and associated contract specific data that collectively describe the risks, liabilities and obligations of the contracting parties and the procedures for the administration of the contract.

(ii) Part C2: Pricing Data

- **C2.1 Pricing Instructions:** Provides the criteria and assumptions, which are assumed for the contract that the tenderer has to take into account when developing the prices.
- **C2.2 Pricing Schedule:** Records the contractor's prices for providing supplies, services, engineering and Construction Works, which are described elsewhere in a specification within the Scope of Work section of the contract.

(iii) Part C3: Scope of Work

Specifies and describes the Supplies, Services, or Engineering and Construction Works to be provided. Any other requirements and constraints, relating to the manner in which the contract work is to be performed, must be described.

- **Standard Amendments to the Standard Specifications** contains amendments to the specifications as published the Specification Authorities
- **Project Specification** includes amendments to the Standard Specifications, and additional specifications specifically applicable to the contract.
- **Other Project Requirements**, such as:
 - Environmental Management Plan
 - Broad Based Black Economic Empowerment
 - Occupation, Health and Safety

(iv) Part C4: Site Information (Engineering and Construction Works Contracts Only)

This part includes a description of the site as at the time of tender with a view to assist the tenderer to plan and price the Works.



CIDB Tender Documentation Guidelines

The various CIDB guidelines and prescripts give full details of how to compile tender documents to ensure uniformity of documentation, and certainty and fairness in procurement processes. These should be consulted and applied in all cases.

5.2 Typical Roadworks Documentation

In terms of typical roadworks documentation, these above sections of the tender documents typically contain the following:

(i) List of Contract Documents

List of Volumes included in the Contract including:

- Standard General Conditions of Contract
- Standard Specifications
- Project Document
- Drawings
- Materials Investigation and Utilisation, which is normally allocated to separate volumes as shown in the side box.

(ii) Part T1: Tendering Procedures

The tendering procedures normally contain three sub-sections:

- **T1.1 Tender Notice and Invitation to Tender:** This contains the tender notice and informs the tenderer who the client is, and what the project involves. Also included is where tender documents can be obtained and queries lodged.
- **T1.2 Conditions of Tender:** This generally contains a copy of the CIDB standard conditions of tender and related rules, as contained in Annexure F of the CIDB Standards for Uniformity for Construction Procurement (CIDB, 2006).
- **T1.3 Tender Data:** This contains all of the conditions applicable to the specific tender that are called for in the Standard Conditions of Tender. A typical example for Roadworks is:
 - F.1.1 The Client is ... The Client's domicilium citandi et executandi (permanent physical business address) is: ... The Client's address for communication relating to this project is: ...
 - F.1.2 The tender documents issued by the Client comprise: (list of documents)
 - F.1.3 The Client's Agent for the Design and Tender stage of the project is ...
 - F.2.1 Tenderers are to be registered with the CIDB, prior to the submission of a tender, in a contractor grading designation of X-CE for (civil engineering, ranges from 1 to 9-CE). Joint Ventures are eligible to submit tenders provided that: ...



Typical List of Documents

A typical list of documents includes the following:

- **Volume 1:** The Conditions of Contract for Construction Works (e.g., FIDIC, SAICE)
- **Volume 2:** The Standard Specifications (e.g., The COLTO Standard Specifications for Road and Bridge Works, 1998, and/or the SABS Standard Specifications. SABS 1200 Standardised Specifications for Civil Engineering Construction.)
- **Volume 3:** The Project Document, containing
 - Tender Notice
 - Conditions of Tender
 - Tender Data
 - Returnable Schedules
 - General and Particular Conditions of Contract
 - Project Specifications
 - Pricing Schedule
 - Form of Offer and Site Information as issued by the Client.The client's Letter of Acceptance and any correspondence from the selected tenderer, performance security-demand guarantee and all addenda issued during the period of tender will also form part of this volume once a successful tenderer has been appointed. This volume also includes the Requirements of the Occupational Health and Safety Act and Regulations.
- **Volume 4:** Roadworks Drawings
- **Volume 5:** Structures Drawings
- **Volume 6:** Materials Investigation and Utilization
- **Volume 7:** Works Quality Plan and Construction Supervision Procedural Manual
- **Volume 8:** EIA Related Documents

- F.2.7 The arrangements for a compulsory clarification meeting are: ...
- F.2.11 The tenderer shall not take the tender document apart and rebind it.
- F.2.12 If a tenderer wishes to submit an alternative tender offer, the only criteria permitted for such an alternative tender offer is that it demonstrably satisfies the client's standard and requirements, the details of which may be obtained from the client's agent.
- F.2.13.2 Tenders to be submitted as follows: ...
- F.2.13.5 The Client's address for delivery of tender offers and identification details to be shown on each tender offer package are: ...
- F.2.13.6 A two envelope procedure will/will not apply.
- F.2.15 The closing time for submission of tender offers is ...
- F.2.15 Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.
- F.2.16 The tender offer validity period is 90 days.
- F.2.23 The tenderer is required to submit with his tender: ...
- F.3.4 The time and location for opening of the tender offers are: ...
- F.3.13.1 Tender offers will only be accepted if: ...
- F.3.18 The number of paper copies of the signed contract to be provided by the Client is 1.

(iii) Part T2: Returnable Documents

A typical list of returnable schedules includes:

- FORM A1: Certificate of Attendance at Site Visit and Clarification Meeting
- FORM A2: Certificate of Authority for Signatory
- FORM A3: Compulsory Enterprise Questionnaire
- FORM A4: Schedule of Variations or Deviations
- FORM A5: Schedule of Addenda to Tender Documents
- FORM A6: Certificate of Tax Clearance
- FORM A7: Certificate of Insurance Cover
- FORM A8: Tenderer's Bank
- FORM A9: Schedule of Current Commitments
- FORM A10: Compliance with Occupational Health and Safety Act, 1993
- FORM A11: Certificate of Registration with CIDB
- FORM A12: Certificate of Tender Compliance
- FORM B1: Contractor's Establishment On Site
- FORM B2: Schedule of Special Materials
- FORM C1: Preferencing Schedule: Tenderer's BEE Scorecard
- FORM D1: Schedule of Work Experience
- FORM D2: Schedule of Contractor's Equipment
- FORM D3: Schedule of Specialist Subcontractors
- FORM D4: Preliminary Programme
- FORM D5: Particulars of The Contract Engineer Appointed by The Contractor as Defined in Sub-Subclause 1.1.25 of the Particular Conditions of the Contract
- FORM D6: Particulars of Acceptance/Quality Control Laboratory and Staff



Alternative Tenders

Generally, before the submission of an alternative tender, the tenderer proposes the concept of the alternative to the client's agent. After discussion with the client, the agent will indicate whether the alternate tender submission will be accepted.

Alternative tenders require the submission of the advertised tender and a separate submission of the alternative tender.

(iv) Part C1.1 Forms of Offer and Acceptance

This typically contains:

- The **Form of Offer** contains the tenderer's tender price (offer) and other declarations.
- The **Form of Acceptance** contains the client's acceptance of the tenderer's offer and related conditions and requirements.



Tender Acceptance

The offer is completed by the Tenderer before the submission of the Tender. The Acceptance form gets completed by the client after the tenderers are evaluated, and the successful tender is selected.

(v) Part C1.2 Contract Data

This section contains all the documents related to the Contract that are signed by the Contractor and Client upon being appointed to carry out the Works. It describes the applicable General Conditions of Contract (GCC), which typically involve one of the following:

- **FIDIC:** Conditions of Contract for Construction for Building and Engineering Works designed by the Client (FIDIC, 1999). See Figure 2
- **SAICE:** General Conditions of Contract for Construction Works (GCC, 2010). See Figure 7.
- **NEC:** Contracts (1995). See Figure 8.
 - Engineering and Construction Short Contract
 - Engineering and Construction Contract
 - Term Services Contract

Where required, amendments to the GCC are contained in the **Particular Conditions of Contract/Special Conditions**. This detailed information is contained in either the Particular Conditions of Contract or the Contract Data. In most cases the information is provided on a single form called **Contract Data/Appendix to Tender** where all the requirements of the particular contract in question are provided. The information may include:

- Programme
- Health and safety
- Environmental protection
- Restrictions of working
- Insurances
- Contract price adjustment procedures
- Retention
- Priority of documents
- BEE requirements
- All requirements in respect of management and administration of the Works, including requirements for extension of time, securities, and guarantees that may be required.

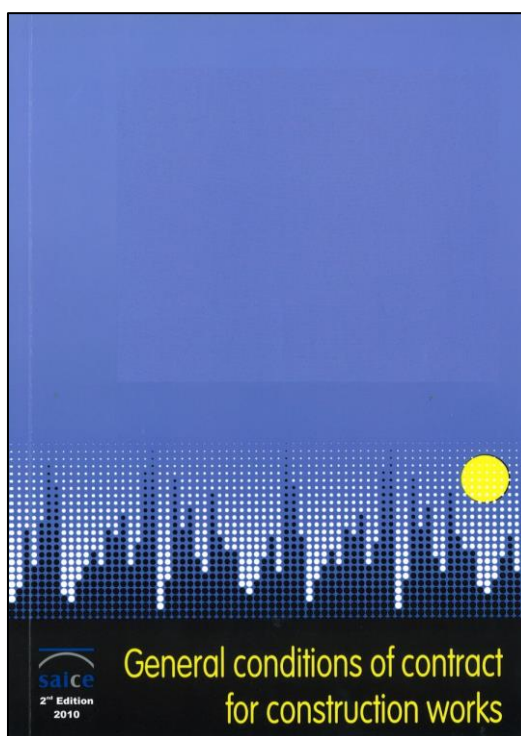


Figure 7. General Conditions of Contract for Construction Works



Figure 8. NEC Contracts

(vi) Part C1.3: Other Standard Forms

- Form of Guarantees (performance and retention)
- Form of Occupational Safety and Health Act agreements
- Pro-forma Appointment of Mine Manager, as required for managing borrow pit utilisation

(vii) Part C2.1: Pricing Instructions

This typically includes the following statements, as well as any other pertinent to the project:

- Measurement and payment shall be in accordance with the relevant provisions of the Standard Specifications as amended in the Scope of Works as well as the relevant portions of SABS 1200 as produced by SABS.
- The units of measurement described in the Pricing Schedule are metric units.
- A list of abbreviators used in the Pricing Schedule.
- For the purpose of the Pricing Schedule, the following words shall have these meanings assigned to them:
 - Unit: The unit of measurement for each item of work as defined in the Standard Specifications (bring in tip box re std specs).
 - Quantity: The number of units of work for each item.
 - Rate: The payment per unit of work for which the Service Provider tenders to do the work.
 - Amount: The product of the quantity and the rate tendered for an item.
 - Lump Sum: An amount tendered for an item, the extent of which is described in the Pricing Schedule, the Scope of Work or elsewhere, but of which the quantity of work is not measured in units.
 - Provisional cost and prime cost sums where a provisional cost includes the total provisional cost for the supply and installation of an item, which is not known in detail at the time of tender. The prime cost sum provides an indicative average cost of only the material to be included in that item. The final cost of both of these is adjusted once the item has finally been completed.
- Unless otherwise stated, items are measured net, in accordance with the drawings. No, allowance is made for waste.
- It is assumed that prices included in the Pricing Schedule are based on Acts, Ordinances, Regulations, By-laws, International Standards and National Standards that were published 28 days before the closing date for tenders. Refer to www.sabs.co.za or www.iso.org for information standards.
- The prices and rates in the Pricing Schedule are fully inclusive prices for the work described under the items. Such prices and rates cover all costs and expenses that may be required in, and for, the execution of the work, described in accordance with the provisions of the Scope of Work. These shall cover the cost of all general risks, liabilities and obligations set forth or implied in the Contract Data, as well as overhead charges and profit. These prices will be used as a basis for assessment of payment for additional work that may have to be carried out.

- Where the Scope of Work requires detailed drawings and designs, or other information to be provided, all costs associated therewith are deemed to have been provided for, and included in the unit rates and sum amount tendered for such items.
- An item against which no price is entered will be considered to be covered by the other prices or rates in the Pricing Schedule. A single lump sum will apply should a number of items be grouped together for pricing purposes.
- The quantities set out in the Pricing Schedule are approximate, as measured by the designer, and do not necessarily represent the actual amount of work to be done. The quantities of work accepted and certified for payment are used for determining interim and final payments due. In a Lump Sum contract, the final quantities in the pricing schedule shall not exceed the lump sum price tendered, and would only vary as provided for in the Contract Data
- Reasonable compensation will be received where no pay item appears in the Pricing Schedule, in respect of work required in terms of the Contract, and which is not covered in any other pay item.
- The short descriptions of the items of payment given in the Pricing Schedule are only for the purposes of identifying the items. More details regarding the extent of the work entailed under each item appear in the Scope of Work.
- The item numbers appearing in the Pricing Schedule refer to the corresponding item numbers in the Standard Specifications, unless stated otherwise.

(viii) Part C2.2:Pricing Schedule

The pricing schedule includes detailed schedules of quantities, as well as summaries and a breakdown of how the tender sum is to be calculated.

(ix) Part C3: Scope of Work

This section describes any particular issues related to the Works that the contractor should take note of in addition to the Standard Specifications.

- **Section A: Standard Amendments to the Standard Specifications:** This section sets out any standard amendments to the standard specifications for the Works, which are developed and issued by client bodies or organisations, and are distributed for inclusion in their Contract documents.
- **Section B: Project Specifications:** This section sets out the project specification, which describes any additions or amendments to the Standard Specifications applicable to the project.
- **Section C: Environmental Management Plan (EMP):** This typically includes all issues that need to be managed by the Contractor during the Construction of the Works to minimize or mitigate harmful environmental effects, in compliance with the National Environmental Management Act (see side-box). It typically includes the following sections:
 - Management of Contractor Activities During the Operations and Maintenance Phase: This section describes the purpose and objectives of the EMP, as well as roles and responsibilities of the client, the client's environmental representative, as well as the appointment processes and duties of the site environmental control officer (SECO) and the external environmental auditor. Any special conditions related to the project are also set out.
 - Construction and Site Camps: This section typically describes issues to be complied with, and managed, in respect of the following, amongst others:
 - Location of construction camps
 - Construction camp restrictions and restraints
 - Ablution facilities
 - Heating and cooking facilities
 - Water for human consumption
 - Eating areas
 - Fencing and no-go areas
 - Fires
 - Workshops
 - Protection of Heritage Resources: This section identifies any known heritage resources, and the management required to preserve them. Also included are actions required in the event that heritage resources are found during the course of the Works.
 - Noise Management: This section describes the management and mitigation of noise in general, as well as noise created by road construction activities and equipment, and blasting and vibration limitations.

- **Soil Management:** This section describes the management and mitigation actions required to limit the impacts of topsoil storage, spoil material, borrow pits and quarries on the surrounding communities and natural environment.
 - **Air Quality Management:** This section describes the management and mitigation of dust, and vehicles and machinery emissions on the environment.
 - **Water Management:** The negative impacts and related actions for water management are set out. This includes the effects of:
 - construction activities,
 - storm water runoff and discharge,
 - erosion protection,
 - flood lines,
 - proximity to rivers, streams and/or wetlands,
 - water abstracted from river and streams,
 - river crossings, alteration of water courses and pollution control
 - **Waste Management:** The handling and disposal of solid waste, to limit and mitigate contamination of the natural environment, and limit impacts on human safety are described. This includes issues such as waste minimisation, waste classification and tracking, domestic waste disposal, construction waste disposal and hazardous waste.
 - **Ecological Management:** This section describes actions required to minimise damage to the ecology by the project. It includes issues such as ecologically sensitive areas and habitats, clearing of vegetation, rare or endangered species, indigenous trees, weeds and alien vegetation, and re-vegetation after construction.
 - **Environmental Awareness Training:** This typically describes any awareness and management training required to sensitize all staff on the above issues.
- **Section D: Broad Based Black Economic Empowerment (BBBEE) Requirements**

Any particular BBBEE requirements are set out in this section.
 - **Section E: Requirements of the OHS Act and Regulations**

This section describes any issues identified as potentially unsafe, as well as how safety and the health of all staff must be assured. Issues dealt with include:

 - Compliance with the Occupational Health and Safety Act 85 of 1993 and all related legislation.
 - The contractor incurring expenses and stoppages from OHS compliance.
 - The duties imposed on the contractor by the Construction Regulations.
 - Implementation of a formal risk assessment programme.
 - The Statutory obligation to issue Personal Protective Equipment (PPE) to employees, and to replace defective PPE free of charge to the employees.
 - Regulatory audits of the Works.
 - The Contractor is required to provide copies of internal Health and Safety manuals, and confirmation of the registration of all the employees with the Workmen's Compensation Commission, with a certified copy of a letter of good standing from the commissioner.
 - Safety specifications and the provision of a safety plan.
 - Maintenance of a health and safety file.

This section also sets out any requirements, or clarifies any issues, considered during the design stage, and how these are dealt with. The OHS organisational structure is shown in Figure 9.



National Environmental Management Act (NEMA) Preamble, 1988

To provide for cooperative environmental governance by establishing principles for decision making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.



Occupational Health and Safety Act: Preamble (Act No. 85 to 1993)

To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities or persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

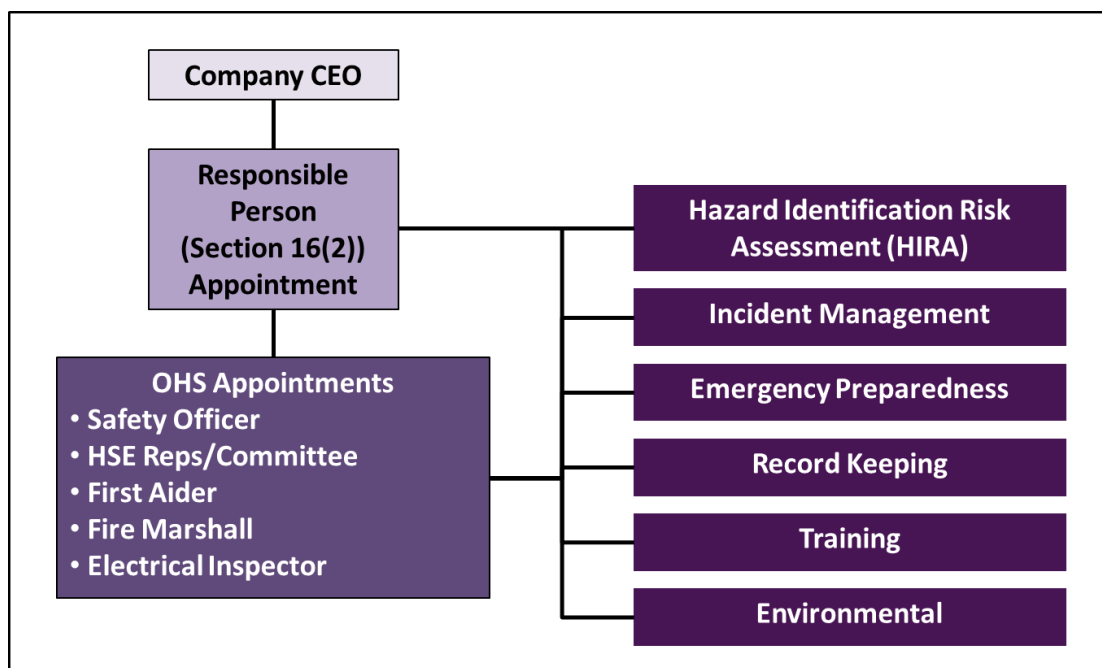


Figure 9. Occupational Health and Safety (OHS) Organisational Structure

(x) Part C4: Site Information

Site information includes:

- Location of the project and arrangements for the site inspection.
- Description of the Works, as well as temporary works required.
- All issues related to preferential procurement and subcontractors.
- Any requirements in respect of plant and materials.
- Descriptions of any services that need to be crossed or moved.
- Location and requirements in respect of the contractor's site establishment.
- Issues related to adjoining properties, material utilisation including borrow areas, and interfaces with other authorities and land-owners.
- Survey issues and locations of any beacons and bench marks.
- Materials investigation and utilisation information is normally contained in a separate volume, Volume 6. It includes information such as centre line soils survey data, borrow pit data and geotechnical data. Chapters 6 and 7 of this manual sets out typical requirements for the content of this section. An example summary is shown in the green side-box. Sometimes the scope of work is insufficient to justify a separate Volume 6 report, and the necessary information is included in the Site Information section, often in an Appendix. An example of this is a reveal that does not require significant materials investigation and utilisation.
- Additional information relevant to the project is included in Appendices to Part C4. For example, rainfall and temperate records and the locality map.
- Information included in Part C4 is for information purposes only. Where the contractor needs to comply with requirements included in this information, they must be specified in Part C1, C2 and/or C3.



Part C4: Site Information

Information included in Part C4 is for information purposes only. Where the contractor needs to comply with requirements included in this information, they must be specified in Part C1, C2 and/or C3.

(xi) Part C5: Annexures

Part C5 is only utilised for the compilation of the Contract Document, and includes items such as:

- Relevant completed standard forms required by the contract, such as a tax clearance certificate.
- All correspondence between the Client and Tenderer during the tender phase.
- All addendums issued during tender phase, such as the minutes of the clarification meeting and any changes to the tender documentation.



Example Summary of Materials Utilisation and Design

1. Introduction

- 1.1 Scope of Investigation
- 1.2 Methodology
- 1.3 Disclaimers

2. Physiography of the Route

- 2.1 Physical Route Description
- 2.2 Geology
- 2.3 Climate
- 2.4 Topography

3. Traffic

- 3.1 Traffic Description
- 3.2 Design Traffic

4. Pavement Design

- 4.1 Construction Information
- 4.2 Traffic and Design Strategies
- 4.3 Proposed Pavement Design

5. Rehabilitation Investigation

- 5.1 Pavement Test Pits
- 5.2 Test Pits: Discussion
- 5.3 Rutting And Riding Quality Measurements
- 5.4 Visual Condition
- 5.5 Deflection Measurements

6. Centre Line Soils Investigation

- 6.1 Investigation
- 6.2 Results of Investigation

7. Borrow Materials

- 7.1 Other Potential Sources of Gravel
- 7.2 Quarries

8. Other Construction Material

- 8.1 General
- 8.2 Coarse Aggregate
- 8.3 Fine Aggregate
- 8.4 Gravel
- 8.5 Asphalt Aggregate
- 8.6 Water

9. Geotechnical Evaluation and Design Recommendations

- 9.1 Introduction
- 9.2 Ground Conditions
- 9.3 Bridges
- 9.4 Major Culverts and Service Crossings
- 9.5 Major Cuttings and Embankments

Note that only the information required by the Contractor needs to be included in Volume 6 of the Contract Documentation.

6. TENDER PROCESS

The tender processes need to follow the CIDB standards for uniformity, contained on www.CIDB.org.za. The following sections outline typical processes that need to be followed for roadworks.

6.1 Advertising Tenders

Tenders need to be advertised widely, with a view to soliciting offers from a fair spread of tenderers. CIDB requires the tender to be advertised on their website. Tenders may also be advertised elsewhere, for example, local and/or national newspapers, South African Forum of Civil Engineering Contractors (SAFCEC) or other bulletins, in accordance with the client's procurement policies.

6.2 Pre-Qualification

In some cases, where tenders involve complex and large scale works, it is useful to pre-qualify contractors and to only allow contractors that can demonstrate adequate capacity to tender for the works. This reduces the number of tenders received that need to be evaluated, and avoids unnecessary tender expenditure by contractors who may not have adequate capacity to carry out the works. In most cases of roadworks in South Africa, it is normally sufficient to use the CIDB Contractor Grading criteria, which only allows contractors with a high enough grading to tender for works above certain values, or which require specific expertise. Pre-qualification is generally only applied to very large or complex contracts.



Pre-Qualification

Pre-qualification is generally only applied to very large or complex contracts. The CIDB Contractor Grading criteria are generally sufficient to ensure experienced enough contractors are used on larger projects, or on projects that require specific expertise.

6.3 Clarification Meeting

Part of the tendering process includes a clarification meeting, which may include a site inspection. During this meeting, all prospective tenderers are informed of all aspects of the project that may be relevant for the preparation of their offers. The clarification process needs to include the provision of a tender information document that includes the following basic information:

- Key plan
- Introduction
- References
- Programme for inspection of the site
- Description of the Works
- Proposed construction programme
- Camp site, services and accommodation
- Summary of quantities
- General requirements
- Annexures
- Photographs
- Notes



Clarification Meeting

Attendance of the clarification meeting, which may include a site inspection, is normally compulsory. Prospective tenderers have to get their certificates of attendance signed during the meeting.

Attendance of the clarification meeting is normally compulsory, and prospective tenderers have to get their certificates of attendance signed during the meeting.

6.4 Tendering

This involves the prospective tenderers assessing the project requirements, preparing prices for the pricing schedule, as well as providing all other information required in the documents.

Finally, the tenderers must deliver their tenders for evaluation, as specified in the tender documents.

6.5 Tender Evaluation

The tender evaluation must be carried out in terms of the Client's procurement policies and the requirements in the tender document, and ensuring the process is fair and transparent. The process should ensure that all the important aspects of the various offers received are properly considered. This typically involves an evaluation of all of the following elements and issues within the offers received, and a preparation of a report on the findings:

- Tender information
- Addenda
- Tenders received
- Completeness of tenders
- Responsiveness of tenderer, in terms of compliance with Conditions of Tender
- Arithmetical errors and omissions
- Analysis of the tendered rates. The rates received from the tenderers for the items in the Pricing Schedule are reviewed statistically. Outliers are analysed, for example by requesting a breakdown of the rate compilation from the tenderer.
- Balancing of rates. Where deemed necessary, and triggered by outliers from the statistical analysis, tenderers are given an opportunity to balance the rates. This requires increasing and decreasing several rates to ensure the tender sum does not change.
- Sensitivity analysis on the tendered rates and quantities of critical payment items
- Cost benefit/net present value analysis, especially if alternative tenders are to be evaluated
- Determine and calculate points based on:
 - Price: The lowest price achieves the highest points.
 - Technical: Points for the technical component are determined on the technical capabilities of the tenderer, for example, qualifications and skills of the key personnel, capacity of the tenderer and available construction equipment.
 - Preferential: Points are allocated on BBBEE status of the tenderer.
- Qualifications
- Alternatives offered
- Proposed sub-contractors
- Programme and cash flow
- Competency of tenderers
- Interviews
- Developmental aspect evaluation
- Conclusions
- Recommendations
- Annexures

The tender evaluation document is provided to the client by the engineering service provider, who then makes the final decision on awarding the tender.

7. CONTRACT DOCUMENTATION

Once the tender evaluation process is complete, the contract is awarded and the contract document for the execution of the Works is compiled and signed.

7.1 Compilation of the Contract Document

The Client, or the agent, converts the accepted tender document to a contract document. All information pertaining to the tender process is removed, i.e., Part T. Relevant information generated during the tender and award process is included, e.g., the annexures to Part C.4.

7.2 Award of Contract

The client awards the contract to the tenderer that complies with the requirements given in Section 6.5. The client signs the letter of acceptance contained in the tender documents, and specifies the date of commencement of the Contract. The Contractor needs to provide the required proof of insurance and the performance guarantee, after which the contracting parties sign the prepared Contract Document.

7.3 Site Handover

Once the Contract Document is signed, the site is formally handed over to the Contractor to construct the Works.

7.4 Monitoring of the Works

Normally the client appoints an agent to monitor the execution of the Contract by the Contractor. The agent supervises the Contractor, to ensure that the Works are constructed according to the specifications and comply with the conditions of the contract, such as the OHS and environmental conditions. The agent also performs quality management of the Works. Construction guidelines are given in Chapter 12, and Quality Management is dealt with extensively in Chapter 13.

The agent also checks and confirms the quantity of work completed on a monthly basis to be able to certify the payment to the Contractor.

Escalation on the cost of work is determined through the calculation of the contract price adjustment (CPA). The published consumer price indices (CPI) together with a formulae in General Conditions of Contract are used to calculate the monthly adjustment. A separate calculation is normally done for materials with volatile prices, such as bitumen, where the monthly rise or fall in the price is taken into account in determining the payment.

7.5 Close-out of the Works

Once the Works are complete, inspected by the parties to the contract, and the items on the snag list are addressed, the Works are taken over by the client through the issuing of a certificate. In FIDIC contracts, this certificate is called the Taking-Over Certificate.

After the defects liability period, the parties again inspect the Works. Identified defects are addressed, after which a certificate is again issued, called the Performance Certificate in FIDIC contracts.

REFERENCES AND BIBLIOGRAPHY

- CIDB. 2006. *Standards for Uniformity for Construction Procurement*. **Government Gazette No. 29138**. Latest edition August 2006. http://www.cidb.org.za/Documents/KC/cidb_Publications/Stand_Codes_Other
- COLTO. 1998. **Standard Specifications for Road and Bridge Works for State Road Authorities**. Committee for Land and Transport Officials. Pretoria. These specifications are currently being revised.
- FIDIC. 1999. **Contract and Agreements**. International Federation of Civil Engineers. www.Fidic.org
- GCC. 2010. **General Conditions of Contract for Construction Works**. 2nd Edition. South African Institute of Civil Engineers, SAICE.
- NEC. 2005. **Contracts**. Latest Edition NEC3. www.neccontract.com
- SAICE. 2004a. Practice Manual #1: **The Use of the South African National Standards in Construction Procurement**.
- SAICE. 2004b. Practice Manual #2: **Delivering Construction Projects using the design by Employer Contracting Strategy**.
- SANS 10403. 2003. **Formatting and Compilation of Construction Procurement Documents**. ISBN 0-626-14196-6. SABS webstore www.sabs.co.za.



TRH Revisions

Many of the TRH guideline documents are in the process of being updated. See the SANRAL website, www.nra.co.za for the latest versions.